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FACTORS INFLUENCING DELIVERY BY SKILLED BIRTH ATTENDANTS AND POSTNATAL HEALTH CHECK AMONG MOTHER IN HLAING-THARYAR TOWNSHIP, MYANMAR

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ABSTRACT

***Introduction**: Complications during pregnancy and childbirth are the leading cause of death among women of reproductive age in Myanmar. It is generally believed by women in developing countries that pregnancy is a natural phenomenon and a part of women's reproductive functions. Problems or complications during pregnancy are also considered by such women as being natural to pregnancy. Low coverage of institutional deliveries, giving deliveries at homes without skilled provider and delays to reach to the health facilities are leading towards the vast majority of maternal deaths in Myanmar.*
***Methods**: The purpose of this study is to identify percentage of skilled birth attendant's utilization among ever-married women (15-49 years) in Hlaing-Tharyar Township, Yangon, Myanmar. A quantitative cross-sectional survey was conducted. A total of 300 ever-married women who had delivered at least one child were selected by simple random sampling and face to face interviews were performed to them by using a pre-tested structured questionnaire. The structured questionnaire including socio-demographic background, history of last pregnancy, accessibility of health services, women's autonomy and male involvement during pregnancy.*
***Results**: The study found that 65 percent of the sample used skilled birth attendants (SBAs) at delivery and the association between mother's education, place of residence, parity, number of antenatal care visits, women's autonomy and male involvement were significantly related with using skilled birth attendant at delivery and postnatal health check. About one-third (35%) were received care from non-SBAs during delivery and the postpartum period in that township. Accessibility to health services and availability of health care personnel were not significantly associated with the use of skilled birth attendants in the delivery and postpartum of the last child.*
***Conclusions**: Findings from this study highlighted that the majority of SBAs were providing reproductive healthcare services with a certain level of quality within the limited resource setting at the study area. There was a need to increase health education activities by SBAs for the pregnant and lactating mothers especially for utilization of maternal health care services. Awareness raising activities on the contraceptive method used should also be enhanced for all lactating women.*

***Keywords**: Skilled Birth Attendants, Postnatal health check mothers, Hlaing-Tharyar, Myanmar*

INTRODUCTION

In Myanmar, every year, 2,800 women die during pregnancy or childbirth [1]. The maternal mortality ratio (MMR) is the second highest among ASEAN countries at 282 deaths per 100,000 live births-

compared to 161 in Cambodia and 20 in Thailand- and the infant mortality rate is 62 per 1,000 live births, compared to 25 in Cambodia and 11 in Thailand [2]. Nearly 42% of maternal deaths occur during the intra-and-early postpartum period and 90% of all maternal deaths happen at a home delivery [3]. Complications during pregnancy and childbirth are the leading cause of death in Myanmar and post-partum hemorrhage was the most leading cause of death; occupied 30% of total deaths [4]. Most maternal mortalities related to the time of death were found at the postnatal period, especially the first 24 hours in these findings [4]. Although the time and cause of death at the national level was known, no report on time and cause of death of mothers and newborns among townships levels remain unreported.

Globally, in evaluating preventable maternal mortality at intrapartum care by skilled birth attendants (SBA) as an indicator for maternal health, it is therefore important to assess the characteristics of women who are and who are not attended by an SBA at childbirth. Postnatal care services are also a fundamental element of the continuum of essential obstetric care which followed immediately after intra-natal care.

The mother who has postnatal care should start as early as possible within 24 hours after birth, even if birth occurs at home and the following timing and frequency are: on day 3, between days 7 and 14, and 6 weeks postpartum [5]. Moreover, World Health Organization (WHO) also highlighted that importance of postpartum care for women as an indicator; the proportion of women who have postpartum contact with a health provider within 2 days of delivery [6].

Giving delivery at homes without skilled care providers and delays to reach to the health facilities are leading towards the vast majority of maternal deaths in Myanmar [4]. Only 37% of the live births in the five years preceding the survey were delivered in a health facility and 63% were delivered at home [7]. Most of the women in Myanmar choose to deliver at home and many do so with an SBA [4]. According to first Myanmar Demographic and Health Survey 2016 (MDHS-2016), proportions of births assisted by SBA was 60% and it was one of the three countries with the lowest coverage in Southeast Asia Region [7].

There was only one postnatal care study in Myanmar and it showed that the prevalence of full postnatal care (PNC) utilization (four postnatal visits and the first visit within 24 hours of delivery) was only 25.2% in rural women but national survey focusing on the timing of postnatal visit revealed that 58% of women received PNC in the two days after delivery from skilled providers [9]. In Myanmar, the socioeconomic gap within and among regions is large. Some areas still face the limited availability of health providers, the poor reach of health services and limited access to health information. Regarding the availability of health providers, the number of doctors more than doubled (from 3242 to 6814) between 1988 and 2017, whereas the numbers of midwives increased by only 11% [8, 26]. Midwives are regarded as the backbone of Myanmar health care system because the most peripheral front-line health facility (sub-rural health center) located deep in the rural community in Myanmar is mainly run by midwives.

The study area, Hlaing Tharyar Township was the highest both maternal and neonatal deaths among 45 townships of Yangon Region and only 55.5% of total births in 2017 were assisted by skilled birth attendant in this township and it was lower than union level 60% and the left 45% was unknown or unreported [10]. Moreover, percent coverage of postnatal contacts within two days of delivery was 68.8% in 2017 but the data did not describe women and newborns separately [10]. A third 5-year strategic plan for Reproductive Health (2014-2018) is being implemented [11]. One of the objectives is to promote skilled and institutional delivery and postnatal care. Three of the targets to be reached are to increase 80% of births attended by a skilled attendant, to increase 80% of antenatal care coverage (at least one) [11]. Without strenuous efforts are undertaken, the above targets are unlikely to be attained. Several studies have assessed the receipt of antenatal care and institutional deliveries in Myanmar. However, none of these studies have reported factors associated with the type of providers of delivery

and postnatal care among mothers, which were the main aims of this study. The results would provide inputs for policy makers and program managers and serve as a tool for intervention heading for improving maternal care utilization.

METHODS

This community-based cross-sectional survey was conducted during July 2019 in Hlaing-Tharyar Township in the Northern district of Yangon. Two-stage sampling method was adopted. First, the township was selected because it has a largest industrial park of Myanmar with a workforce of nearly 300,000 most of whom (90 percent) are young women and they are currently working in industrial zones of this township [8]. This township has 20 wards[1] and 17 villages[2] and urban population is 70%. The list of total mothers who live in their houses in the study area for at least previous two consecutive years until the date of data collection and women who had delivered during 2018 were obtained from a township health center. All the 20 wards and 17 villages under the study area were listed. In the first stage, eight wards and seven villages were selected by using simple random sampling. In the second sampling stage, study subjects were identified from each random ward and village by using simple random sampling technique. Township health staff initially helped to identify the study population. In total, 300 women (160 from urban and 140 from rural areas) were interviewed.

Maternity services available in the study area

This township is provided by one township hospital, one station hospital, two urban health centers, one rural health center and six sub-rural health centers as government sectors. Regarding 2018 township health profile of Hlaing-Tharyar, delivery services are available in all spaces except in one sub-center (Shan-Chaung). A health assistant, nurses, a lady health visitor (LHV), midwives (MWs) are the key providers of maternity services in the study site [10].

Dependent Variable

A woman can get postpartum care by an SBA if she delivers by an SBA. But, every woman who receives postpartum care by SBA is not always delivered by SBA. Therefore, the study assessed the utilization of SBA which was defined as the mothers receiving both delivery and postnatal health check by SBA within two days after delivery. For bivariate analysis, the outcome responses were divided into two models: (1) mother who received delivery by SBA or not, and (2) mother who received postpartum care from SBA within two days after delivery or not. For multivariate analysis, the outcomes variables were dichotomized into two groups: mothers who received both delivery and postnatal health check within two days of delivery by SBA are coded as 1, and mother who did not receive these criteria are coded as 0.

Independent Variable

The PRECEDE-PROCEED planning model (PPM) will apply for building for a conceptual framework because the utilization of maternal health care services is mostly related to health care seeking behavior [12]. This model has eight phases but the study mainly focuses on phase three; it includes predisposing factors, enabling factors and reinforcing factors. As a socio-demographic background: the age of mother, mother's highest level of education, family income per capita, parity, place of residence and mother's occupation was included. The number of antenatal care (ANC) visits, knowledge of mother in danger signs of pregnancy and child health and source of health information were also defined as predisposing factors. Knowledge was measured using 34 questions for knowledge on dangers signs of pregnancy and neonatal health. Correct answers were scored 1 for each question. The high score indicated more knowledge.

[1] Ward: an administrative area of townships in urban/cities
[2] Village tract: a group of near-by villages in rural

Accessibility to the nearest health center, availability of health care personnel at the health center and affordability to delivery and postpartum care were considered as enabling factors in this study. Accessibility to maternal care was defined as the number of walking hours from women's house to the nearest health center that is, if the nearest health center was situated within less than 30 minutes traveling distance and this was counted as easy accessibility to the nearest health center, otherwise, as difficulty in access [13].

Availability of the health care personnel in health center included the availability of at least one SBA (doctor, nurse, health assistance (experience in midwifery skills), lady health visitor, midwives) at the health center either during ANC visits or during women's delivery. Affordability means the amount of costs during delivery (drugs, consultation fees, hospital costs, travel costs, other costs) and it can reflect access to delivery care or women's ability to pay for delivery services. There is a lot of studies discussed women's autonomy. However, in this study, women's autonomy was measured in this study refers to making decisions about maternal health care by herself or not. Male involvement was considered if the woman was provided with transportation assistance for perinatal visits by her husband and the couple had a mutual discussion for maternal healthcare usage. For more simple analysis and better interpretation purposes, all numerical independent variables were categorized.

Data Analysis

Descriptive statistics were used to describe the demographic characteristics of the respondents and explore the frequency and percentage distribution of these variables. Chi-square test was used to assess the relationship between the dependent variable and independent variables. Data were analyzed using Stata Version 14 software program. As a result, 300 women fitting the eligibility criteria were recruited in person, with the assistance of local health authorities. Participants were selected by inclusion criteria which included married women, aged between 15 and 49 years, who had lived in the study site at least 2 consecutive years and had delivered a baby within the last year. The reason why the study measured socioeconomic status and accessibility of health services throughout the pregnancy and during delivery. Married women were willing to participate in the study by signing a consent form. Exclusion criteria included the women who had severe disease with complications and those who had incomplete answers.

Ethical consideration

The survey of which this study based on has been approved by Institutional Review Board (IRB) at Institute for Population and Social Research, Mahidol University with Certificate of Exemption (COE) No. 2019/05-181 and the Ethical Committee of University of Public Health, Yangon, Myanmar [UPH-IRB (2019/Research/29)] approved this study.

RESULTS

Background characteristics of the respondents

Based on **Table 1**, nearly 60% of respondents were at the age between twenty-five and thirty-four. Most of the women 35% completed secondary or higher than secondary school level. While reviewing the place of residence, about 53% of respondents were from the urban area and 46% were from the rural area. Regarding parity, most of the women 57% had ≥ 2 children; while 43% had only one child. Regarding regular income per family, almost half of women 52% reported above the median level. Most of the women 43% reported not working or full-time housewives. Nearly half of the participants 56% had at least four ANC visit, of which 7% had no antenatal care. Knowledge of mother in maternal and child health assesses how much the married women know about the danger signs of pregnancy, delivery, postpartum care, and neonatal care. Most of the mothers 86% had moderate awareness of perinatal danger signs, including neonatal health risks and it means that the answers were below 14 out of total

24 scores (total scores = highest scores of all participants). Low knowledge means that all the answers were incorrect in all scores. In contrast, only 5%, classified as having a high level of awareness of pregnancy, delivery, postpartum and neonatal danger signs, could name more than 15 out of total 24 scores. Nearly 59% perceived maternal health information from health care providers.

Majority of women 75% reported that the number of traveling times from home to the nearest formal health centers was within 30 minutes. Respondents answered most of the health care personnel were available 68% but significantly few respondents did not know about the availability of health care personnel 31%. Nearly 52 % of women paid ≥ 50,000 kyats on delivery services and postpartum care (1 US$=1500 kyats). However, 55% of women could not decide about maternal health care and their husbands or head of households like parents decided instead of her. Regarding receiving support from family, around 68% of respondents got support from their husbands such as traveling assistance and mutual discussion for seeking and receiving maternal healthcare services.

Table (1) Percentage distribution of utilization of skilled birth attendants on delivery and postnatal health check within two days after delivery according to background characteristics.

Characteristics	Response	Number	Percent
Socio-demographic factors			
Age of mother	15-24	73	24.33
	25-34	176	58.67
	35-44	51	17.00
Mother's education	Primary or below level	119	39.67
	Secondary or higher level	181	60.33
Regular income (Per family)	<300,000 MMK	142	47.33
	≥300,000 MMK	158	52.67
Parity	1 child	29	43.00
	2-4 children	156	52.00
	≥5 children	15	5.00
Place of residence	Urban	160	53.33
	Rural	140	46.67
Mother's occupation	Government employment	6	2.0000
	Private employment	86	28.67
	Employer	3	1.00
	Own account worker	34	11.33
	Unpaid family worker	16	5.33
	Dependent	131	43.67
	Others	24	8.00
Predisposing Factors			
Number of antenatal care visits	No care	21	7.00
	< 4 times	109	36.33

Characteristics / Socio-demographic factors	Response	Number	Percent
	≥ 4 times	170	56.67
Knowledge of mother in maternal and child health	Poor knowledge	24	8.00
	Moderate knowledge	260	86.67
	Good knowledge	16	5.33
Source of health information	Health-care providers	178	59.33
	Non-health care providers	122	40.67
Enabling factors			
Accessibility to nearest health facility	Within 30 minutes	225	75.00
	30 minutes to 1 hour	65	21.67
	1 hour to 1 hour and 30 minutes	4	1.33
	More than 1 hour and 30 minutes	6	2.00
Availability of health care providers at health center	Available	206	68.67
	Not-available	94	31.33
Affordability to delivery and postpartum care	<50,000 MMK	142	47.33
	≥50,000 MMK	158	52.67
Reinforcing factors			
Women's autonomy	Yes	135	45.00
	No	165	55.00
Male involvement	Yes	205	68.33
	No	95	31.67

MMK= Myanmar Kyats

Determinants of utilization of skilled birth attendants: Bivariate analysis

Of the 300 mothers in this study, 197 mothers delivered by SBA and 203 mothers utilized postpartum care from SBA within two days after delivery. There were seven mothers received postpartum care from SBA but they did delivery by auxiliary midwives (non-SBA). The results from the bivariate analysis presented in **Table (2)** and p-value of each variable stated that most of the factors in **Table (2)** were statistically associated with delivery and postpartum care within two days after delivery. There were consists of mother's education, regular income per family, parity, place of residence, mother's occupation, number of antenatal care visits, knowledge of mother in maternal and child health, source of health information, affordability to delivery and postpartum care.

Determinants of utilization of skilled birth attendants: Multivariable analysis

The results of the logistic regression analyses are presented in **Table (3)**. Adjusted for other variables in the model, significant positive predictors of seeking delivery and postpartum care within two days from SBA included the socio-demographic factors of mother's age being 25-34 years (AOR, 2.81; 95% CI, 1.22-6.41), family having higher income level (AOR, 1.95; 95% CI, 0.99-3.84), mother's being of low parity (i.e. the first birth) were twice as likely to receive SBA as their counterparts having high parity (AOR, 2.47; 95% CI, 1.15-5.30), mothers who worked at paid job were more likely to use SBA (AOR, 0.38; 95% CI, 0.19-0.74) compared to those in unpaid job, mothers lived in rural area were less likely to use SBA than women in urban area (AOR, 0.31; 95% CI, 0.15-0.63). In predisposing factors, mothers who knew at least one danger signs of pregnancy and neonatal health were 13 times more likely to use SBA at delivery and the postnatal period (AOR, 13.53; 95% CI, 3.13-58.40). In enabling factors, the mothers who afforded money such as payments like transportation costs and other opportunity costs (≥50,000 MMK) were eleven times more likely to use SBA as their counterparts affording <50,000 MMK (AOR, 11.52; 95% CI, 5.37-24.68).

Table (2) Factors associated with the utilization of SBA at delivery and postpartum checkup within two days after delivery in bivariate analysis

Characteristics	Response	Delivery (n=300)		p-value	Postpartum checkup (n=300)		p-value
		Nature of birth attendants			Nature of birth attendants		
		Unskilled	Skilled		Unskilled	Skilled	
		n (%)	n (%)		n (%)	n (%)	
Socio-demographic characteristics							
Age of mother	15-24	29(39.73)	44(60.27)	0.184	27(36.99)	46(63.01)	0.178
	25-34	53(30.11)	123(69.89)		49(27.84)	127(72.16)	
	35-44	21(41.18)	30(58.82)		20(39.22)	31(60.78)	
Mother's education	Primary or below level	58(48.74)	61(51.26)		56(47.06)	63(52.94)	<0.001
	Secondary or higher level	45(24.86)	136(75.14)		40(22.10)	141(77.90)	
Family income	<300,000 MMK	59(41.55)	83(58.45)	0.013	56(39.44)	86(60.56)	0.009
	≥300,000 MMK	44(27.85)	114(72.15)		40(25.32)	118(74.68)	
Parity	First	23(17.83)	106(82.17)	<0.001	77(45.03)	94(54.97)	<0.001
	Second or higher	80(46.78)	91(53.22)		19(14.73)	110(85.27)	
Residence	Urban	38(23.75)	122(76.25)	<0.001	38(23.75)	122(76.25)	<0.001
	Rural	58(41.43)	82(58.57)		58(41.43)	82(58.57)	

Characteristics	Response	Delivery (n=300)		p-value	Postpartum checkup (n=300)		p-value
		Nature of birth attendants			Nature of birth attendants		
		Unskilled	Skilled		Unskilled	Skilled	
		n (%)	n (%)		n (%)	n (%)	
Mother's occupation	Paid job	41(26.80)	112(73.20)	0.005	37(24.18)	11(75.82)	0.003
	Unpaid job	62(42.18)	85(57.82)		59(40.14)	88(59.86)	
Number of antenatal care visits	No ANC or <4 times	67(51.54)	63(48.46)	<0.001	65(50.00)	65(50.00)	<0.001
	≥4 times	36(21.18)	134(78.82)		31(18.24)	139(81.76)	
Predisposing factors							
Knowledge of mother in maternal and child health	Poor knowledge	20(83.33)	4(16.67)	<0.001	20(83.33)	4(16.67)	<0.001
	Moderate knowledge	78(30)	182(70)		74(28.46)	186(71.54)	
	Good knowledge	5(31.15)	11(68.75)		2(12.50)	14(87.50)	
Source of health information	Health-care providers	49(47.57)	54(52.43)	0.003	44(24.72)	134(75.28)	<0.001
	Non-health care providers	129(65.48)	68(34.52)		52(42.62)	70(57.38)	
Enabling factors							
Accessibility to nearest heath facility	Within 30 minutes	80(35.56)	145(64.44)	0.249	74(32.89)	151(67.11)	0.315
	30 minutes to 1 hour	22(33.85)	43(66.15)		21(32.31)	44(67.69)	
	> 1 hour	1 (10)	9 (90)		1 (10)	9 (90)	
Availability of health care providers at health center	Available	67(32.52)	139(67.48)	0.329	62(30.10)	144(69.90)	0.296

Characteristics	Response	Delivery (n=300)		p-value	Postpartum checkup (n=300)		p-value
		Nature of birth attendants			Nature of birth attendants		
		Unskilled	Skilled		Unskilled	Skilled	
		n (%)	n (%)		n (%)	n (%)	
	Not-available	36(38.30)	58(61.70)		34(36.17)	60(63.83)	
Affordability to delivery and postpartum care	<50,000 MMK	79(55.63)	63(44.37)	<0.001	75(52.82)	67(47.18)	<0.001
	≥50,000 MMK	24(15.59)	134(84.41)		21(13.29)	137(86.71)	
Reinforcing factors							
Women's autonomy	Yes	55(40.74)	80(59.26)	0.035	53(39.26)	82(60.74)	0.015
	No	48(29.09)	117(70.91)		43(26.06)	122(73.94)	
Male involvement	Yes	57(27.80)	148(72.20)	<0.001	50(24.39)	155(75.61)	<0.001
	No	46(48.42)	49(51.58)		46(48.42)	49(51.58)	

p-value are significant at p<0.001, p<0.01, p<0.05, MMK= Myanmar Kyats
Skilled birth Attendants: doctor, nurse, health assistance (experience in midwifery skills), lady health visitor, midwives [27].
Unskilled birth attendants: Auxiliary midwives and Traditional birth attendants [27].

Table (3) Adjusted odds ratio of factors associated with utilization of SBA at delivery and postpartum checkup within two days after delivery

Socio-demographic characteristics	AOR	95% CI	p-value
Age of mother			
15-24	(reference)		
25-34	2.81*	1.22-6.41	0.014
35-44	1.40	0.50-3.94	0.496
Regular income (Per family)			
<300,000 MMK	(reference)		
≥300,000 MMK	1.95*	0.99-3.84	0.054

Socio-demographic characteristics	AOR	95% CI	p-value
Parity			
Second or higher	(reference)		
First	2.47*	1.15-5.30	0.02
Residence			
Urban	(reference)		
Rural	0.31***	0.15-0.63	0.001
Mother's occupation			
Paid job	(reference)		
Unpaid job	0.38**	0.19-0.74	0.005
Predisposing factors			
Number of antenatal care visits			
No ANC or <4 times	(reference)		
≥4 times	2.50**	1.27-4.94	0.008
Knowledge of mother in maternal and child health			
Poor knowledge	(reference)		
Moderate knowledge	13.53***	3.13-58.40	0.001
Good knowledge	2.97	0.42-21.01	0.275
Enabling factors			
Affordability to delivery and postpartum care			
<50,000 MMK	(reference)		
≥50,000 MMK	11.52***	5.37-24.68	0.000

n=300, Pseudo R^2 = 0.3856, LR chi2(16) = 148.80, Significant=0.0000, log-likelihood = -118.56664
p-value are significant at, ***(p<0.001), **(p<0.01), *(p<0.05), MMK= Myanmar Kyats

DISCUSSION

In this paper, we have examined that influences the utilization of skilled birth attendants by delivery and postnatal period among mothers aged 15-49 in the study area, Myanmar. The aim of the study was to determine the percentage of mothers using the SBAs at delivery and the postnatal period in a selected area and the associations between a number of predisposing, enabling and reinforcing factors. The study highlighted the poor utilization of skilled birth attendants among mothers, only two-thirds 65.67% of whom received delivery and postnatal care although the study area is close to the former capital city of Yangon. The results showed that the level of using SBAs at delivery and the postnatal period in the selected areas was higher than the national average 58.8% and 71% [7]. Although the SBA rate was higher than the national level and it was still lower than the regional level of 80% in 2015 [10]. Moreover, the result might not reflect the representative coverage of SBA in that township because the sampling frame was drawn from the birth registration records. Mothers who came to the sub-center for their child's birth registration were those women who could potentially easily access health care services and were familiar with the midwives.

Relative to rural women, urban women were at significantly greater odds of practicing delivery and postpartum care by SBA (AOR =0.31). Current findings in this study, compared with age group15-24 years, middle age groups such as 25-34 years have more delivered and received postpartum care by SBA (AOR =2.81) but > 35 years' age group has not association with delivery and postpartum care. These findings from our study were against by two studies, one study from nationwide survey of Kenya and one cross-sectional survey of Myanmar [14, 15].

According to the finding of this study, the women who received ANC from skilled persons were two times more likely to use SBAs at delivery and postnatal health check (AOR=2.50). It was expected that antenatal care visits would have a positive impact on the utilization of SBAs for mothers who live in that study area. Giving health education during ANC visits, mothers may become more aware of possible danger signs during delivery and postnatal period. Counseling during ANC visits help in increasing familiarity between the health care persons and mother, reducing delays in seeking their services and creating more positive attitudes to use skilled health personnel [16].

In this study, parity may also cause the significant effect the utilization of skilled birth attendants during delivery and the postnatal period (AOR=2.47). Low parity women were two times delivered with SBA than high-parity mother. Another study showed that women who were pregnant with their first child were usually more likely to have difficulties during labor and delivery compared to women of high parity and it followed that low- parity women being more motivated to deliver with SBA than high-parity women [17].

In this study, the majority of women 43% is full-time housewives and it means that they have no income in the study area. There is an association between employment status and utilization of SBA at delivery and postpartum care (AOR=0.38). Nearly one-third of women 28% were worked at private employment and the study area has the largest industrial park of Myanmar [2]. When women are working and earning money, they were wholly or partially independent of their husband. As a consequence, those women can access resources and making decisions themselves including on health issues. Occupation of women helped improved the decision making the power of the women and cause them to use SBAs. The study findings were also consistent with other studies from Timor and Myanmar [18,19]. A household with higher socioeconomic status associated with delivery with SBAs or taking health care services. In our study, family with low per-capita income (less than 300,000 MMK; less than median score) were less likely to use SBA. It was found that low income resulted in financial hardship, leading to barriers for taking SBA at delivery and postnatal care. All things considered, the results of our study were consistent with Nepal and Ethiopia studies [20,21].

Affordability to delivery care and postpartum care i.e. amount costs for both two care services was strongly associated with utilization of SBA. More than half of the women 52% paid > 50,000 kyats for delivery (1US$=1500 kyats). Less than 50,000 kyats were the amount below the international poverty line as determined by World Bank for 2018. Therefore, the mother who cannot afford above the poverty line resulted in barriers for taking SBA at delivery and postnatal care. In Myanmar, 31% of populations were below the international poverty line in 2018 (<1.90 US$ per day); most of them live in a rural area [22]. Although all maternal and child health services are theoretically free of charge in Myanmar, indirect and informal payments like transportation costs and other opportunity costs are remarkable financial barriers in assessing health services.

Knowledge of danger signs related to maternal and child health services is an important process and output indicator one for the expected health outcome, to increase the proportion of birth at which a skilled birth attendance at birth which is one of the birth preparedness plan [23]. High awareness of danger signs were very strong pull factors on the utilization of SBA. In this study, knowledge of women

on delivery and postpartum care is also positively associated with the utilization of SBA. Mothers who knew at least one danger signs of pregnancy and neonatal health were 13 times more likely to use SBA at delivery and the postnatal period (AOR, 13.53; 95% CI, 3.13-58.40). The study's findings were also consistent with prior studies on knowledge of maternal and child health care [20, 24, 25].

The main strength of this study is that this is the first study to reveal the prevalence and factors associated utilization of SBA on delivery and postpartum care, based on the updated WHO 2013 postnatal guideline, among the peri-urban area of Myanmar. In addition, the evidence obtained from the current research provides updated knowledge and assistance for the policymakers and health care providers to extend quality maternal healthcare package nationwide. However, the study reports past behaviors of mothers during delivery last year, and therefore the possible chance of recall bias. However, a one-year recall period will be minimizing recall bias. The estimated data about the total population of mothers between 15 to 49 years of age in that selected areas were obtained from the midwives of the township health department. This data was estimated according to birth registration records. Therefore, mothers who did not include in those records will not participate in this research. Moreover, the result of this research was only applicable in this area. However, it is hoped that possible interesting results may have a pilot effect for study on a large scale. To obtain in-depth information qualitative methods should be used in data collection but only quantitative data collection method had been used.

Implications

Although reproductive health care programs are scaling up, utilization of SBAs at delivery and postpartum care in the study area is low. The key factors on utilization of postpartum care were mother's age, parity, family income, number of antenatal care visits, place of residence, mother's occupation, knowledge of mother in maternal and child health and affordability to delivery and postpartum care. On the basis of the evidence generated in this study, quality health education programs should be urgently needed to reach out to less-educated mothers. Program intervention is needed to encourage all pregnant women to use SBAs at antenatal care visits, delivery and postnatal period according to the timing of updated WHO guideline to achieve universal coverage. Strategies to improve the availability and accessibility of antenatal care services to counsel mothers about postpartum care and skilled birth attendants should increase utilization of SBA among mothers in the study area. Thus, a future study focusing on the quality of SBA at maternal and child health care services and satisfaction on services the women should be recommended.

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